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AN INVESTIGATION OF FACTORS RELATED TO SUCCESS IN A FIRST COURSE IN CHEMISTRY AT THE PENNSYLVANIA STATE UNIVERSITY

- Carl W. Bordas

Problem

The problem was to ascertain whether certain factors contribute to the success of students in a first course in chemistry at The Pennsylvania State University.

Procedures

From a total enrollment circa 3,666 students (four groups) in Chemistry 1 and 3 (Fall of 1954-55, 1955-56), the names of 389 "A" students and 531 "F" students were selected.

In order to perform an analysis of some of the contributing factors that may affect a student's success in college chemistry, the following data were collected from the student's application forms on file at the Dean of Admissions Office: date of birth; name of high school; town and state where high school was located; year of graduation from high school; whether the student had high school chemistry, chemistry laboratory, physics, physics laboratory, algebra, plane geometry, trigonometry, biology, general science; and the student's high school chemistry grade.

The Department of Psychology furnished the scores the "A" and "F" students made on The Pennsylvania State University aptitude examination.

The size of the high school from which the student graduated was obtained from the Secondary School Classification Reports at the Department of Public Instruction in Harrisburg, Pennsylvania.

Major Findings

When significant r's or t's were obtained for two (2) or more of the four groups considered, the variable may be considered important. In order of importance are the following variables: The Pennsylvania State University aptitude examination (Moore-Castore) results; high school chemistry grades; having had high school mathematics, chemistry, and physics.

Conclusions

Realizing that the group studied was not a complete college population, the data were interpreted as follows:

1. Age has very little effect on college freshman chemistry success.
2. Having had high school chemistry does affect favorably college freshman chemistry success.
3. High school chemistry laboratory has little effect on college freshman chemistry success, provided the student has had high school chemistry.
4. Completion of high school physics, solid geometry, and trigonometry has fairly strong positive influence on college freshman chemistry success.

Algebra and plane geometry as high school subjects have some influence on college freshman chemistry success.

Biology, general science, and physics laboratory have very little

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influence on college chemistry success.

5. Those who make the better grades in high school chemistry do superior work in college freshman chemistry.

6. Students who made high scores on The Pennsylvania State University aptitude examination do better in college freshman chemistry.

7. Size of the high school from which a student has graduated has no effect on his college freshman chemistry.

8. Although there appears modest positive correlations between success in college chemistry and factors already enumerated, there are apparently other factors that are of significance in the ultimate success of students in a beginning chemistry course.

Recommendations and Implications

1. When high school chemistry with laboratory and high school physics with laboratory were compared with high school chemistry and physics without laboratory, it was not possible to clearly differentiate the difference in terms of number of "A" and "F" students; therefore, it is recommended that and investigation of high school chemistry and physics laboratories be undertaken in order to determine the cause of this apparent lack of influence on college chemistry success.

2. The study shows that the most successful college freshman chemistry students more often select high school chemistry, physics, and higher mathematics, and those less successful students select high school biology and general science; therefore, a more thorough study should be made in order to determine the effectiveness of the high school biology and general science program.

3. It is recommended that a method be devised, possibly using the scores from The Pennsylvania State University aptitude examination, high school chemistry grades, etc. in order to select those students who would be given a preliminary, remedial course in general chemistry, similar to Elements of Compostion (0) given to students of English who show deficiencies in this subject on entering the University.

4. The study shows that those students who had completed high school chemistry, physics, algebra, solid geometry, trigonometry, and plane geometry did better in the first course in college chemistry. It is recommended that those students who had selected these courses in high school be encouraged to take college chemistry.

5. When planning high school curriculums, mathematics and physics, as well as chemistry, should be emphasized in a course of study for prospective science personnel.

6. Guidance personnel in the high school should make a special attempt to influence students with scientific aptitude to select high school chemistry, physics, and mathematics. This idea is a reinforcement of the value of stricter entrance requirements to be used by various college programs of study.

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